



Experiences on an Itanium Based Grid Testbed at UPRM

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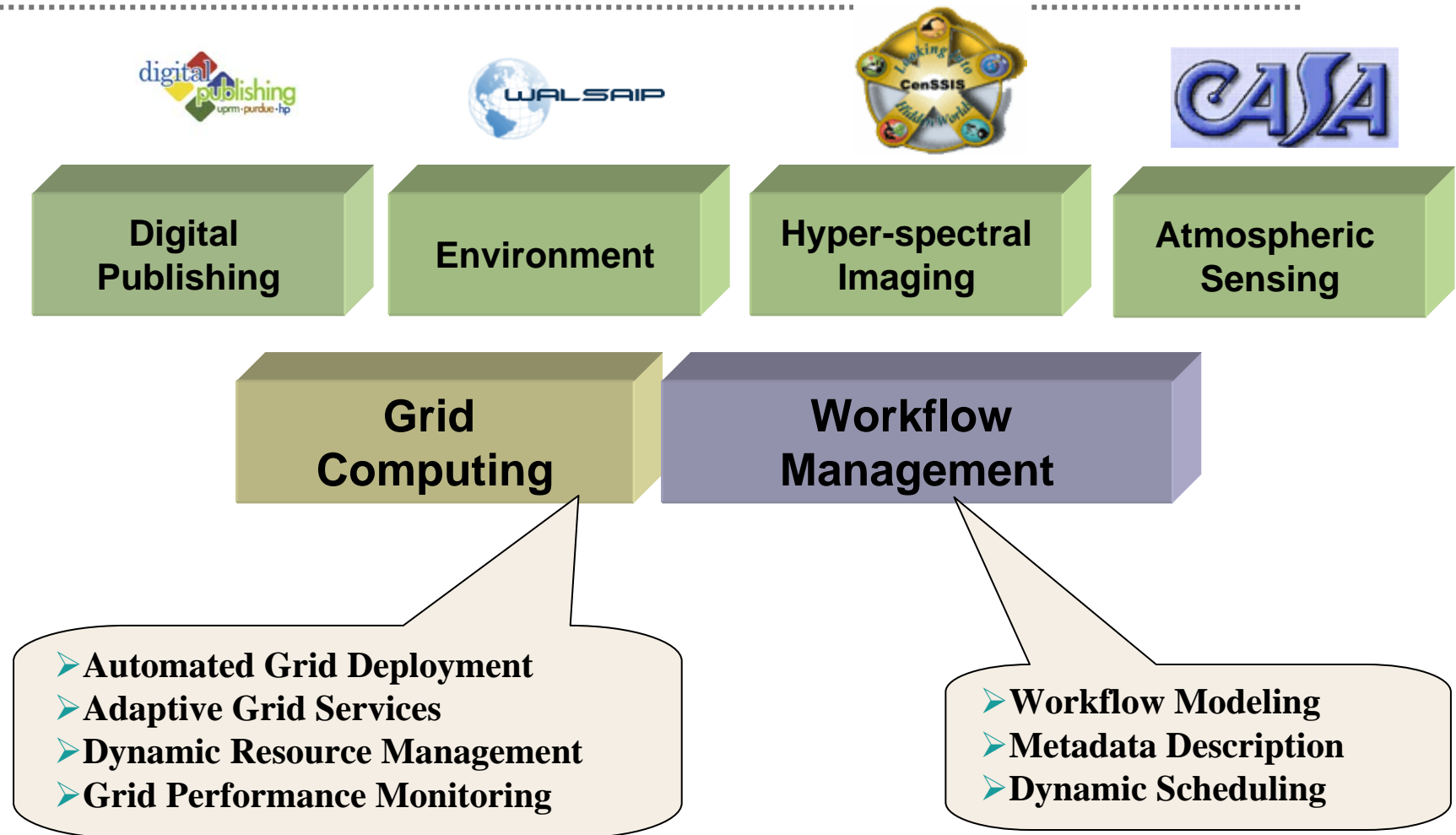
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Gelato ICE, San Jose, California
April 23-26, 2006

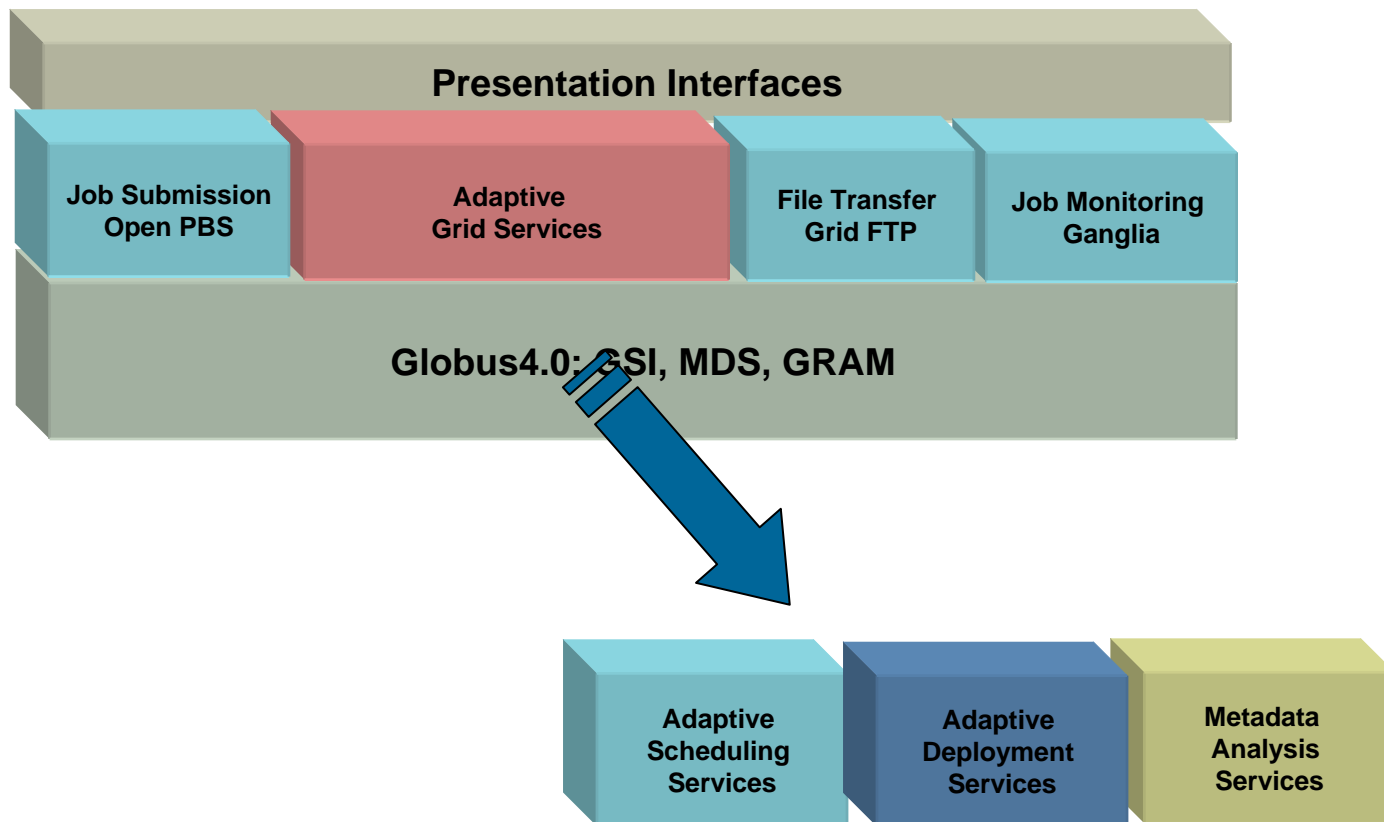
Agenda

- Overview of PDCLab Research
- PDCLab Grid testbed
- Research results
 - Hyper-spectral imaging
 - Dynamic scheduling
 - Distributed radar data

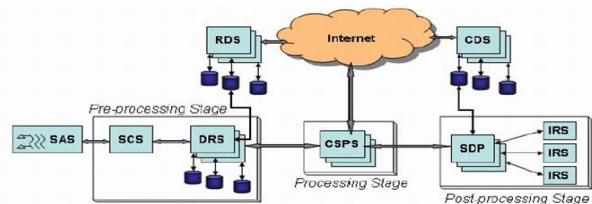
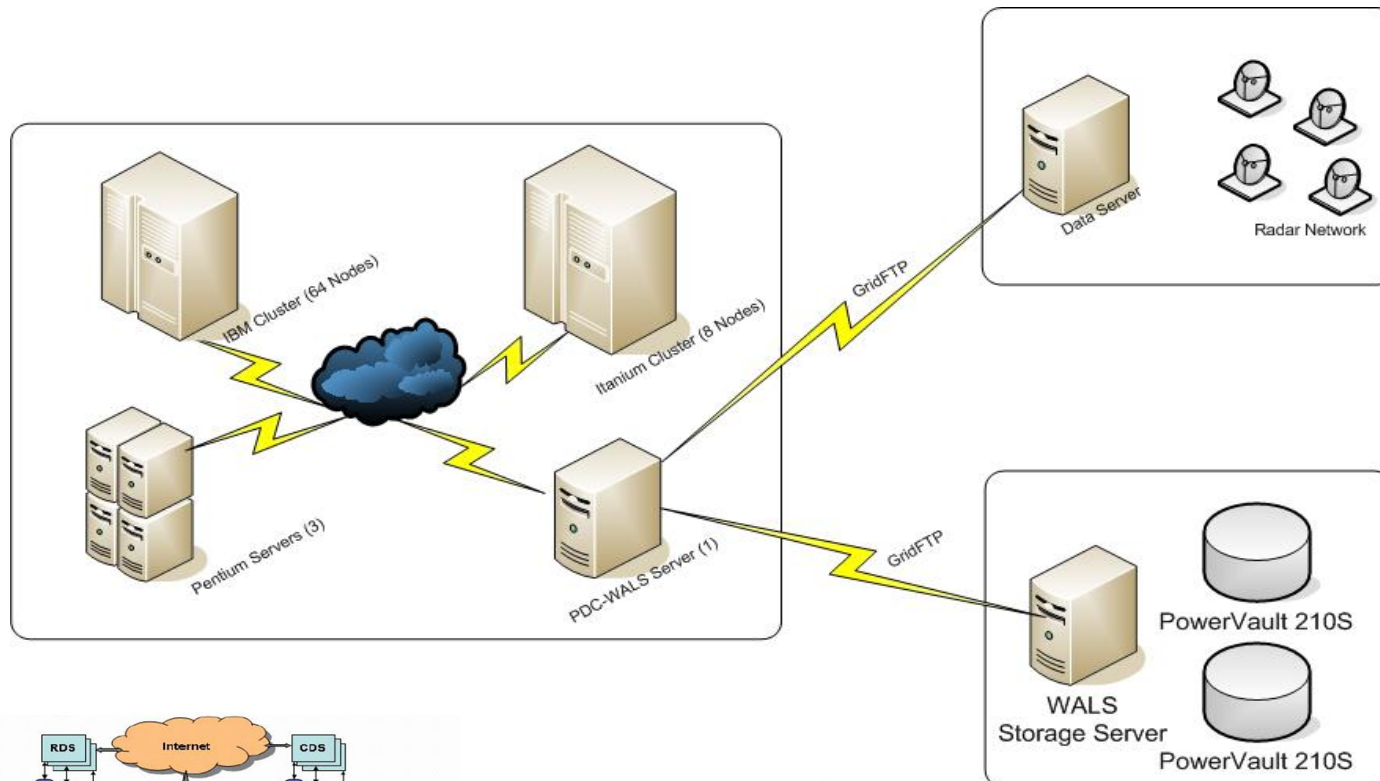
PDCLAB Research



PDCLAB Research

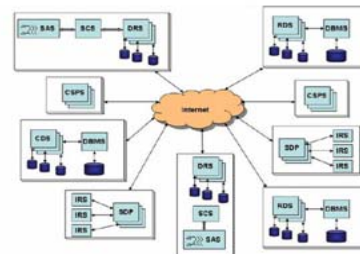


PDCLab Grid Testbed



SAS: Sensor array structure;
 DRS: Data representation system
 CSPS: Computational signal processing system
 SDP: Signal data post-processing

SCS: Signal conditioning system
 RDS: Raw data server
 CDS: Computed data server
 IRS: Information Rendering System



PDCLab Grid Testbed

- A Linux Beowulf Cluster that consists of 65 2-Way SMP Intel Pentium III at 1.2GHz with 1 GB of Memory and 20GB of storage.
- Eight (8) IA-64 Itanium servers (each server is dual processor at 900 MHz, 8GB of memory and 160GB of SCSI Ultra 320 storage).
- Two (2) IA-32 Pentium IV servers (each server is dual processor at 3.06 GHz, 1GB of memory and 160GB of ATA-100 storage)
- One (1) IA-32 Pentium III server (dual processor at 1.2 GHz, 2GB of memory and 40GB of SCSI Ultra 160 storage)
- One (1) Intel Xeon server (dual processor at 3.60GHz, 2 GB of memory and 2TB of storage)
- One (1) Intel Xeon server (dual processor at 2.80GHz, 1 GB of memory and 200 GB of storage)



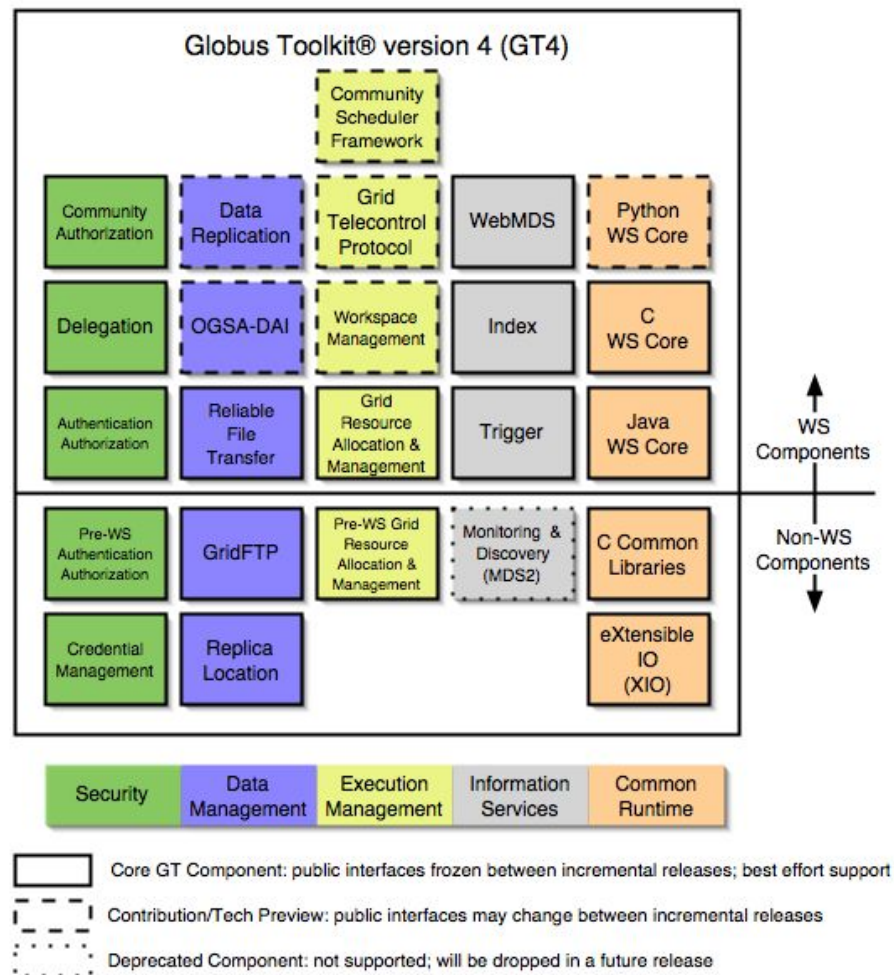
64 nodes Linux Cluster (IA-32)



8 nodes Itanium Servers (IA-64)

PDCLab Grid Testbed

- CentOS 4.2
- Globus Toolkit 4.0.1.
 - OpenPBS
 - Torque
 - PostgreSQL
 - Apache Ant version 1.6.5
 - Java SDK version 1.5
 - Jakarta Tomcat version 5.5.9.

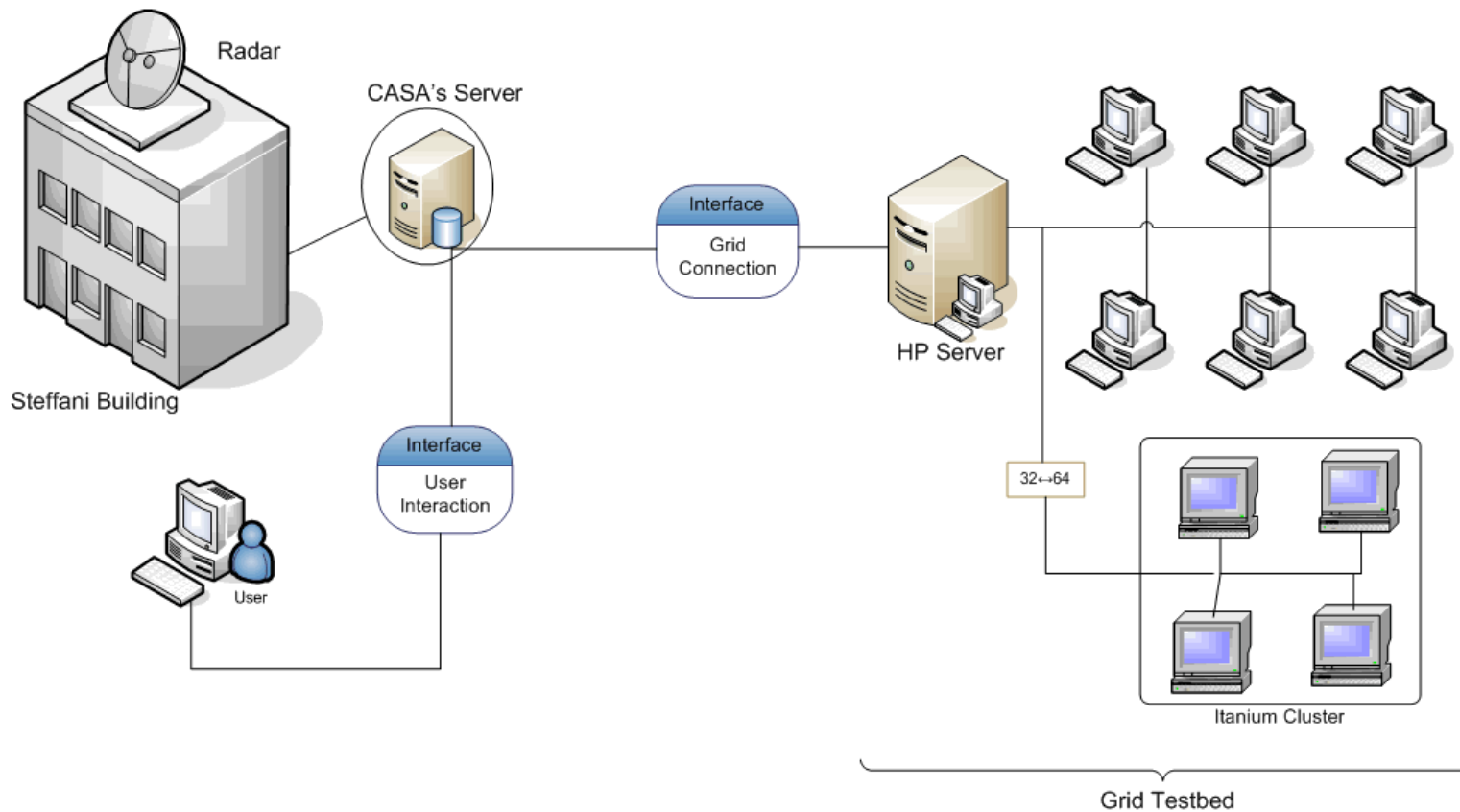


PDCLab Grid Testbed

Table 1: Configuration and Installation scripts

Script	Description
addgridnode.sh	Add nodes to our grid-node file database
addgriduser.sh	Create user accounts on the grid
gt-preinstall.sh	Manage the installation of the globus toolkit requirements
gensshkeys.sh	Create SSH keys
centos-config-common.sh	Configure a minimal grid node with CentOS
centos-config-server.sh	Configure a minimal grid node with CentOS (server edition)
OpenPBS-Client-Setup.sh	Install and configure a node as an OpenPBS client
OpenPBS-Server-Setup.sh	Install and configure an OpenPBS server
Torque-Client-Setup.sh	Install and configure a node as an Torque client
Torque-Server-Setup.sh	Install and configure a Torque server
makesshgkh.sh	create a global known hosts file for SSH

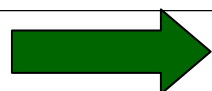
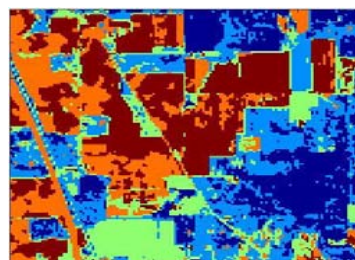
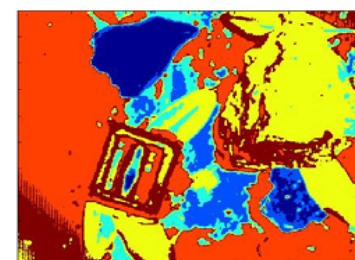
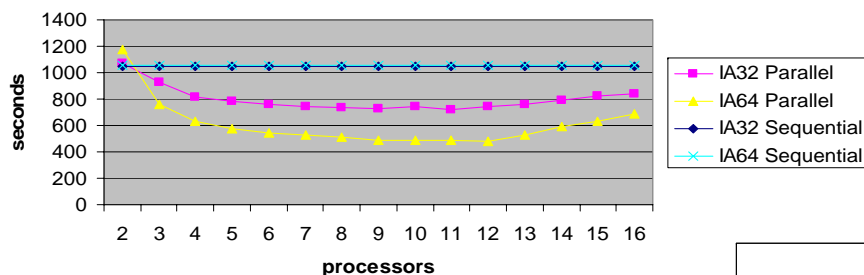
PDCLab Grid Testbed



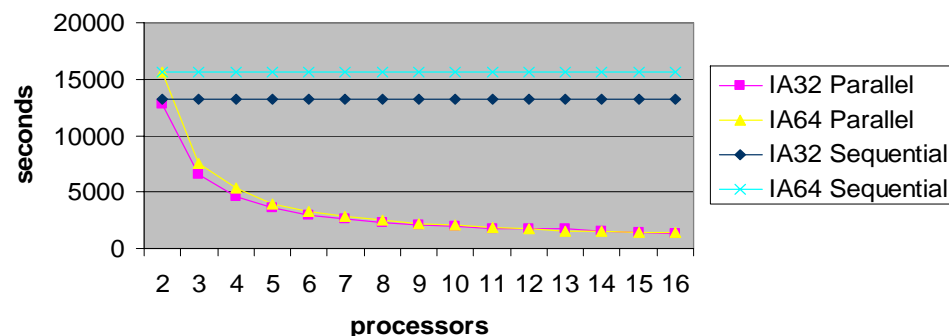
Hyper-spectral Imaging Algorithms



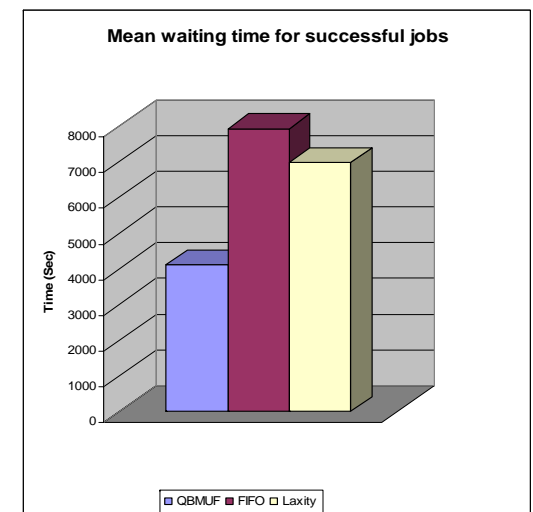
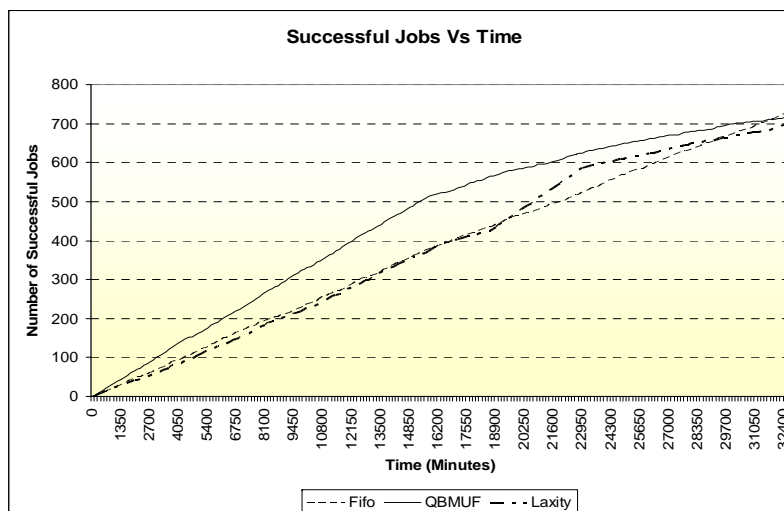
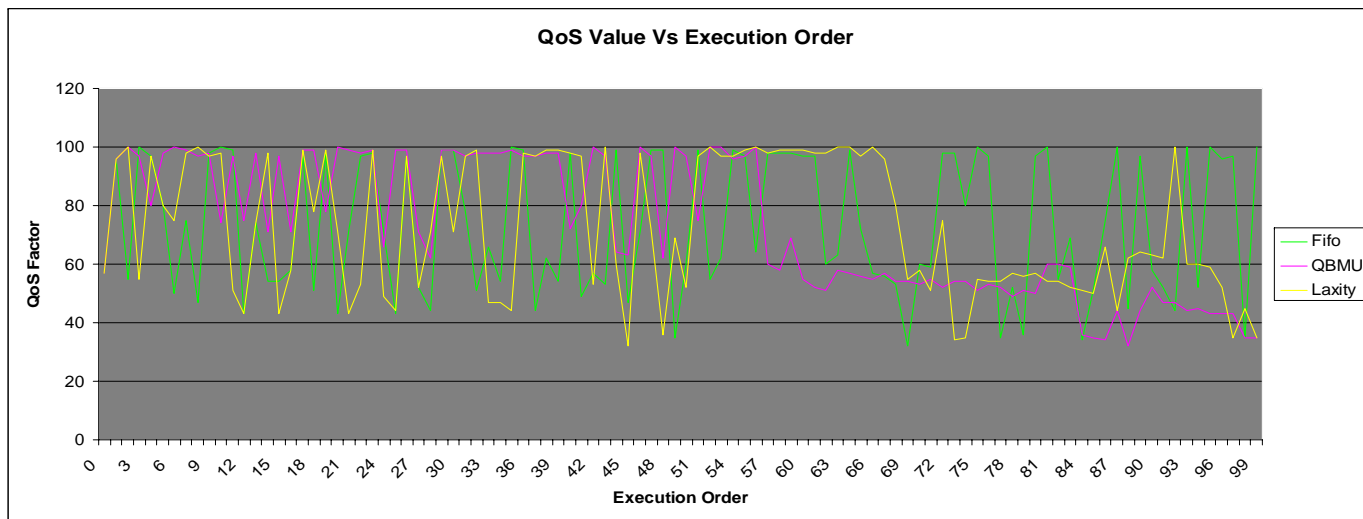
Feedback Iterative Method
UPRM Test Image, 3 bands of 33
5,436 combinations



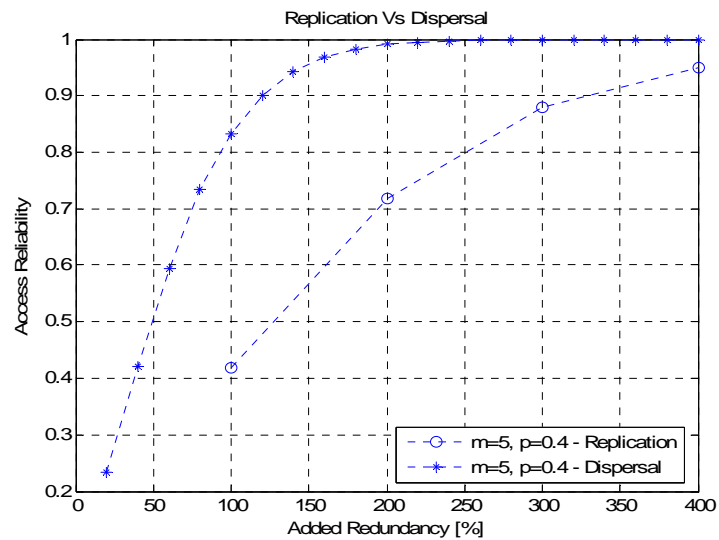
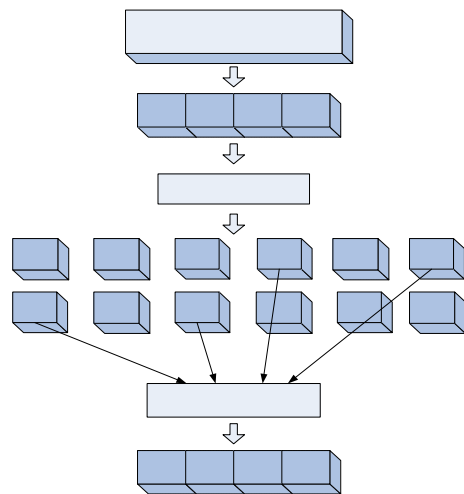
Feedback Iterative Method
Indian Pine Site AVIRIS Image, 3 bands of 220
1,750,540 combinations



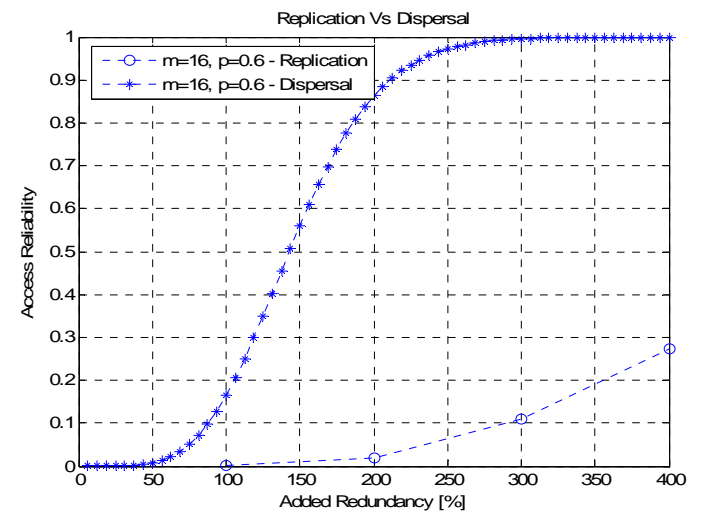
Adaptive Scheduling



Distributed Radar Data Retrieval and Processing



Data File F



1

3

9

10

6

4

5

2

12

7

8

11

Publications

- D. Arias and W. Rivera, "Using Grid Computing to Enable Distributed Radar Data Retrieval and Processing" IEEE International Conference on Network Computing and Applications, 2006.
- W. Lozano and W. Rivera, "An Adaptive Quality of Service Based Scheduling Algorithm for Wide Area Large Scale Problems." IEEE Workshop on Adaptive Grid Computing, 2006.

Acknowledgements to Contributors

- Kennie Cruz (system Administrator)
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